

Claims

1. Reflection-photometric analytical system comprising a measuring head (10) consisting of a radiation source (36) and a radiation detector (26) for the reflectometric examination of a target surface (12) of a test object (14), in particular a test strip for body fluids such as urine or blood, which is arranged at a distance from the measuring head (10), **characterized by** a triangulation unit (16) operating on the basis of optical triangulation for checking the distance of the measuring head (10) from the target surface (12) without contact.
2. Analytical system as claimed in claim 1, **characterized in that** the triangulation unit (16) has a light emitter (34) directed towards the target surface (12) in an incidence axis (42) and a light receiver (48) pointing towards the target surface (12) in the direction of a receiving axis (50).
3. Analytical system as claimed in claim 2, **characterized in that** the incidence and receiving axis (42, 50) intercept at a reference point (52) at a specified angle and the reference point (52) defines a reference position of the target surface 12.
4. Analytical system as claimed in claim 2 or 3, **characterized in that** the incidence and receiving axis (42, 50) enclose different angles relative to a perpendicular on the target surface (12).
5. Analytical system as claimed in one of the claims 2 to 4, **characterized in that** the light receiver (48) has a position resolving sensor at right angles to the receiving axis (50) and in particular a PSD sensor, CCD sensor or multi-element diode sensor (46).

6. Analytical system as claimed in one of the claims 2 to 5, **characterized in that** the light receiver (48) is a double sensor with two single sensors (46) preferably arranged next to one another and symmetrically to the receiving axis (50).
7. Analytical system as claimed in one of the claims 2 to 6, **characterized in that** the light receiver (48) has a collecting optical system (44) whose optical axis defines the receiving axis (50) for focussing the light reflected from the target surface (12).
8. Analytical system as claimed in one of the claims 2 to 7, **characterized in that** the light emitter (34) has a light source (38) in particular a point light source and a collimating optical system (40) whose optical axis defines the incidence axis (42) for generating a light beam which is incident on the target surface (12).
9. Analytical system as claimed in one of the claims 2 to 8, **characterized in that** the light emitter (34) has a modulation stage (54) for the time-varying and preferably pulsed-shaped actuation of a light source (38).
10. Analytical system as claimed in one of the claims 2 to 9, **characterized in that** the light emitter (34) has an edge generator (56) to produce non-linear and preferably exponentially increasing or decreasing light pulses
11. Analytical system as claimed in one of the claims 1 to 10, **characterized in that** the triangulation unit (16) advantageously has a signal processing circuit (60) for determining changes in the distance relative to a reference position on the target surface (12).
12. Analytical system as claimed in claim 11, **characterized in that** the signal processing circuit (60) has a comparator (64) and a timer (66) to determine the time interval of specified signal amplitudes of output signals of the triangulation unit (16).

13. Analytical system as claimed in one of the claims 1 to 12, **characterized by** a control device (18) that interacts with the triangulation unit (16) to set a specified distance between the target surface (12) and measuring head (10) by means of a servodrive (28).
14. Analytical system as claimed in one of the claims 1 to 13, **characterized in that** the path of the measuring head (10) can be recorded by a path measuring device (74) to determine a height profile of the test object (14).
15. Analytical system as claimed in claim 14, **characterized in that** the path measuring device (74) has a height profile store (78) to identify the test object (14).
16. Analytical system as claimed in one of the claims 1 to 15, **characterized in that** the triangulation unit (16) has a subsequent evaluation unit to standardize the results of the photometric analysis on the basis of the distance between the target surface (12) and measuring head (10).
17. Analytical system as claimed in one of the claims 2 to 16, **characterized in that** the light source (36) is at the same time the light emitter (34) and/or the radiation detector (26) is at the same time the light receiver (48) of the triangulation unit (16).
18. Method for the reflectometric analysis of a target surface (12) of a test object (14) arranged at a distance from the measuring head (10) and in particular of a test strip for body fluids such as urine or blood **characterized in that** the measuring distance between the measuring head (10) and target surface (12) is examined by means of a triangulation unit (16) on the basis of optical triangulation.

19. Method as claimed in claim 18, **characterized in that** the changes in the distance are preferably detected relative to a reference distance of the target surface (12) by means of a corresponding light deflection onto a light receiver (48) of the triangulation unit (16).
20. Method as claimed in claim 18 or 19, **characterized in that** the measuring distance is kept constant by means of a control device (18).